CHAPTER 1

INTRODUCTION

1.1. Background of Study

Apitherapy uses traditional medicine in terms of bee products for disease prevention and treatment purposes (Trumbeckaite et al., 2015). In apitherapy, bee products such as honey, pollen, propolis, royal jelly and bee venom has been investigated to promote healing (Hellner et al., 2008). Propolis is a main component in bee hives that is actively being involved in recent research. It is a sticky substance that binds the hive together applied by honey bees *Apis mellifera* L (Popova, Bankova, and Trusheva, 2016). and is known to have medicinal properties (Fratellone, Tsimis and Fratellone, 2015).

Propolis primarily consists of resin (50%), wax (30%), essential oils (10%), pollen (5%), and other organic compounds (5%) (Gomez-Caravaca et al., 2006). Propolis has been confirmed to have beneficial pharmacological properties by recent research which it is antimicrobial, antiviral, antioxidant, anticancer, anti-inflammatory. immumodulatory, and agents anticaries (Wagh, 2013). Furthermore, Zhao et al. (2016) studied that the Brazilian green propolis is effective in improving antioxidant function in Type 2 Diabetes Mellitus patients.

Figure 1.1 Raw Bee Propolis (Conrad, 2016)

Stingless bee is less favored as it produces less amount of honey, but it produces propolis in a higher quantity than other bees in terms of potency (Zakaria et al., 2016). In Malaysia, study on propolis is rarely conducted compared to other countries. In fact, preliminary investigations on the composition and biological activity of propolis derived from Malaysian stingless bees are still incomplete and lacking of reliable evidences (Ibrahim et al., 2016). This study was aimed to identify the most ideal solvent for extraction and to analyse the beneficial chemical composition such as flavonoids and phenolics in Malaysian stingless bees *Trigona Thoracica species* propolis.

1.2. Problem Statements

Propolis has been cultivated and commercialized into medical devices, over the counter preparations, health supplements, cosmetics and other health related items due to its beneficial biological properties and hence increasing its market demand. However, crude propolis cannot be utilised as the main components which is known for biologically active components are the flavonoids and other phenolic derivatives.

Propolis must undergo extraction and purification to obtain the desired components. Many extraction methods are time consuming with low yield. Studies were conducted on the effect of different extraction solvents to identify the selectivity of desired components to extraction solvent for higher yield. Hence, extraction methods

are researched to obtain the most optimal extraction method and the least time consuming method.

Knowledge on the chemical composition of propolis is limited. Propolis differs in each location due to the specific climatic and phyto-geographic conditions of each plant sources causing its chemical composition to alter. The standardization and quality control of propolis products is hard to be achieved. Therefore, serious efforts have been made to overcome this obstacles resulting in slight improvement. For further development of propolis in the pharmaceutical industry, further efforts must be carried out to evaluate the propolis components.

1.3. Research Objectives

To resolve the problems stated, the objectives are defined as follows:

a. To perform extraction of propolis using water as extraction solvent.
b. To analyse or evaluate propolis extract by using Thin Layer Chromatography (TLC), High Performance liquid Chromatography (HPLC) and Ultraviolet–Visible UV-VIS Spectrometry analysis.

1.4. Scope of the study

This research studies and compares the yield of propolis extracted when using different extraction solvent. Furthermore, this study further evaluates and analysed the composition of reactive and desirable chemical components in the obtained propolis extract with using different analytical evaluation method. The respective extraction solvent may also provide propolis extract with different yield of chemical components. Hence, the study determines the most suitable extraction method and analytical method for evaluation.

This research allows further knowledge to be gain on the affinity of the flavonoids and phenolic components towards various extraction solvents. Different extraction methods are used to obtain the optimal condition of the extraction process.